UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 73540

10TH STREET BRIDGE (MSAS NO. 101)

OVER THE

MISSISSIPPI RIVER

DISTRICT 3 - STEARNS COUNTY, CITY OF ST. CLOUD

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 84)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 73540, Piers 2, 3, 4 and 5, were found to be in good condition with no defects of structural significance observed. A vertical crack was observed in the web of Pier 4 with a maximum width of 1/4 inch. There was footing exposure observed at the upstream ends of both Piers 4 and 5 with a maximum vertical face exposure of 3 feet. The channel bottom appears to be in stable condition with only minor localized scour observed at the upstream ends of the piers and with no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

(A) Footing exposure was observed at the upstream ends of Piers 4 and 5. The exposure at Pier 4 extended 20 feet downstream on the west side of the pier with a maximum vertical face exposure of 2 feet. The exposure at Pier 5 extended 8 feet to the downstream on both sides of the pier with a maximum vertical face exposure of 3 feet.

(B) A 1/8 to 1/4 inch wide vertical crack was observed on Pier 4 extending from 3 feet below the waterline to the top of the concrete web wall at the center of the pier on both the east and west faces.

(C) A 1/4 inch wide crack was observed on the top of the footing at the center of the west side of Pier 4, extending from the west edge of the footing to the face of the pier shaft.

(D) Minor scour depressions, typically 5 foot in radius and 2 to 3 feet deep, were observed around the upstream ends of all the piers, resulting in the footing exposure at Piers 4 and 5.

(E) A light to moderate accumulation of timber debris was observed at the upstream ends of Piers 2, 3, and 4.

RECOMMENDATIONS:

(A) Monitor the noted cracks during future inspections. If found to be progressing, consideration could be given to sealing and structurally mending the cracks at Pier 4 by epoxy injecting and/or patching at that time.

(B) Scour screening assessment indicates stable rating, therefore, presently it is only necessary to monitor extent of scour and footing exposure during future inspections.

(C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 73540

Feature Crossed: The Mississippi River

Feature Carried: 10th Street Bridge (MSAS No. 101)

Location: District 3 - Stearns County, City of St. Cloud

Bridge Description: The superstructure consists of seven spans of multiple prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments and six reinforced concrete piers. The piers are numbered 1 through 6 starting from the west end of the bridge. The footings of all the substructure units are supported on steel H-piles.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins

Date: September 27, 2002

Weather Conditions: Sunny, "50E F

Underwater Visibility: "1.5 Feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 2 through 5.

General Shape: Each of the piers consists of two flared columns which extend down to form a single oblong rectangular shaft, which is supported by a rectangular footing/seal combination founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 16.1 feet.

4. WATERLINE DATUM

Water Level Reference: The bottom of the pier cap at the south end of Pier 5.

Water Surface: The waterline was approximately 29.6 feet below reference.
Waterline Elevation = 979.5.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

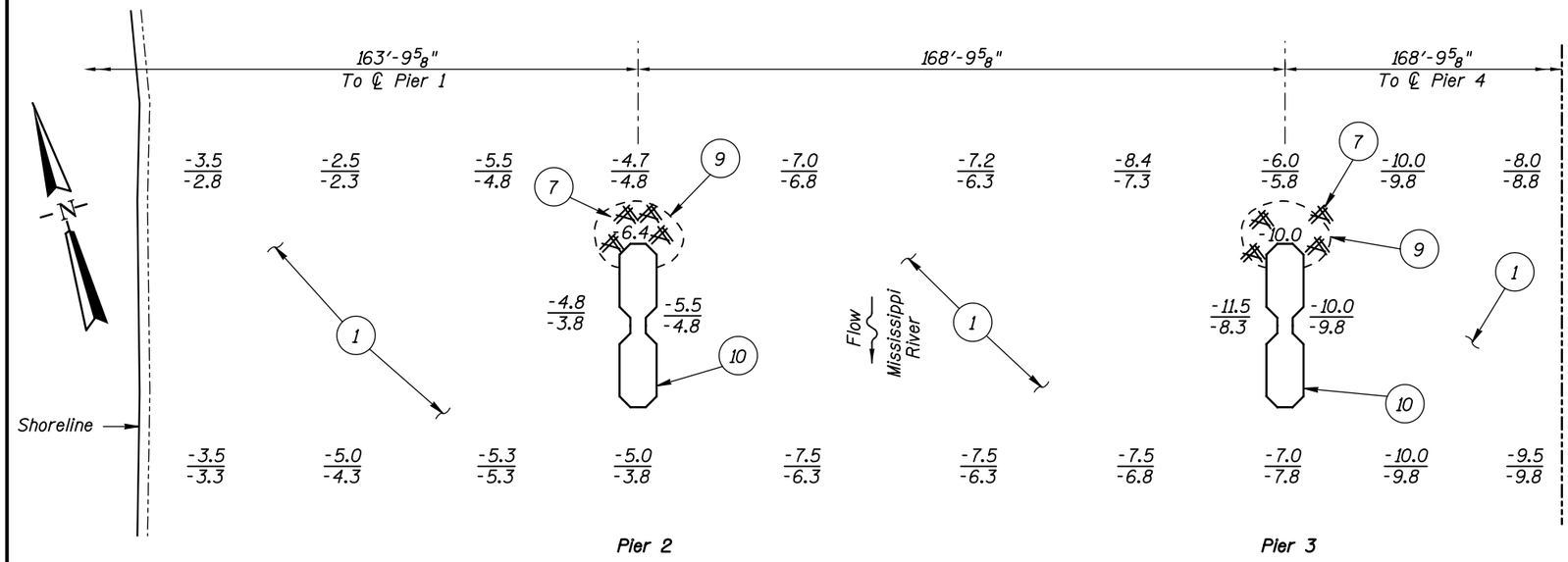
Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/09/02

Item 113: Scour Critical Bridges: Code N/92

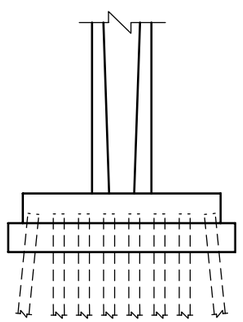
Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.
_____Yes __X__ No



SOUNDING PLAN

INSPECTION NOTES:

1. The channel bottom material consisted of sandy gravel and random cobbles with a maximum probe rod penetration of 2 inches.
2. The channel bottom material consisted of loose sand with a maximum probe rod penetration of 2 feet at the upstream end of Piers 4 and 5.
3. Footing exposure was observed at the upstream end of Pier 4, extending 20 feet downstream on the west side of the pier and 18 feet downstream on the east side, with a maximum vertical face exposure of 2 feet at the upstream nose.
4. Footing exposure was observed at the upstream end of Pier 5, extending 8 feet downstream on both sides of the pier, with a maximum vertical face exposure of 3 feet at the upstream nose.
5. A vertical crack was observed along the centerline of the pier extending from 3 feet below the waterline to the top of the web wall with a 1/4 inch maximum width.
6. A crack was observed on the top of the west side of the footing extending to the center of the pier face with a maximum width of 1/4 inch.
7. A moderate accumulation of 18-inch-diameter and smaller timber debris was observed at the upstream end of Piers 2 and 3 extending from 5 feet below the waterline to the channel bottom.
8. A light accumulation of 2-inch-diameter and smaller timber debris was observed at the upstream end and along the east face of Pier 4.
9. Minor scour depressions, typically 5 foot in radius and 2 to 3 feet deep, were observed around the upstream ends of all the piers, resulting in footing exposure at Piers 4 and 5.
10. The submerged concrete of the piers and exposed footings was in good, smooth and sound condition.



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 2 through 5 were inspected underwater.
2. At the time of inspection on September 27, 2002, the waterline was located approximately 29.6 feet below the bottom of the pier cap at the downstream end of Pier 5. This corresponds to a waterline elevation of 979.5 based on the previous report dated September 11, 1997.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

Legend

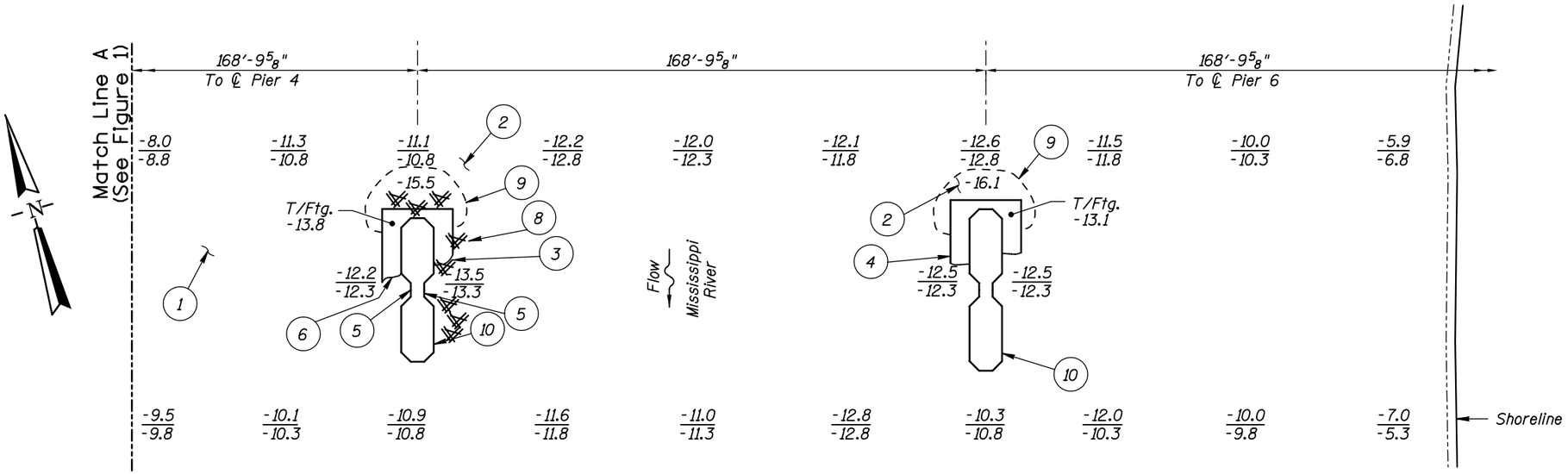
-7.0 / -6.8	Sounding Depth from Waterline (9/27/02) / Sounding Depth from Waterline (9/11/97)
	Timber Debris
	Scour Depression

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 73540
OVER THE MISSISSIPPI RIVER
DISTRICT 3, STEARNS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: SEPT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120084		Figure No.: 1



SOUNDING PLAN

Notes:

Refer to Figure 1 for General Notes.

Refer to Figure 1 for Inspection Notes.

Legend

-7.0 / -6.8	*Sounding Depth from Waterline (9/27/02) / Sounding Depth from Waterline (9/11/97)*
	Timber Debris
	Scour Depression

MINNESOTA
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INSPECTION AND SOUNDING PLAN

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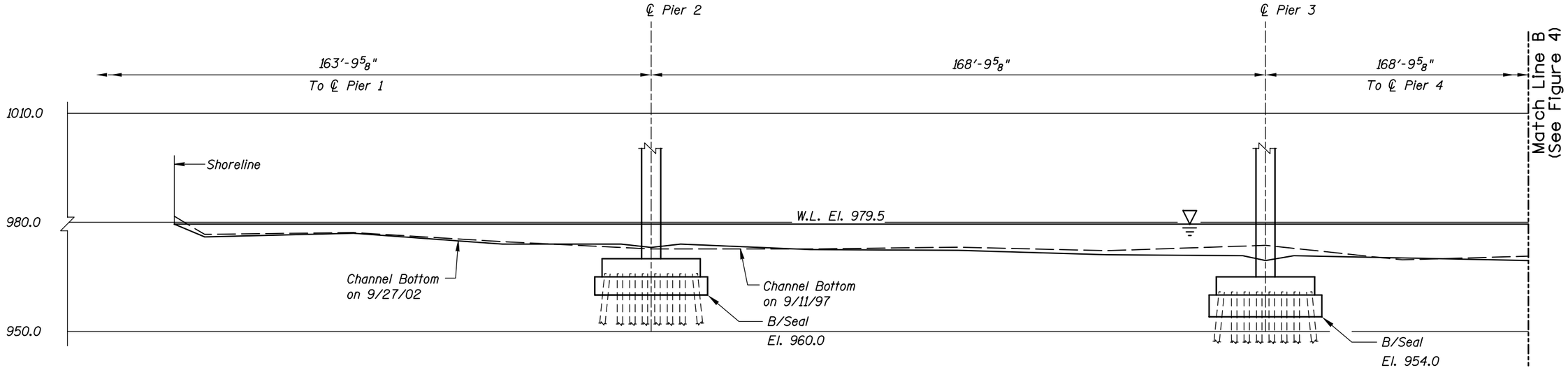
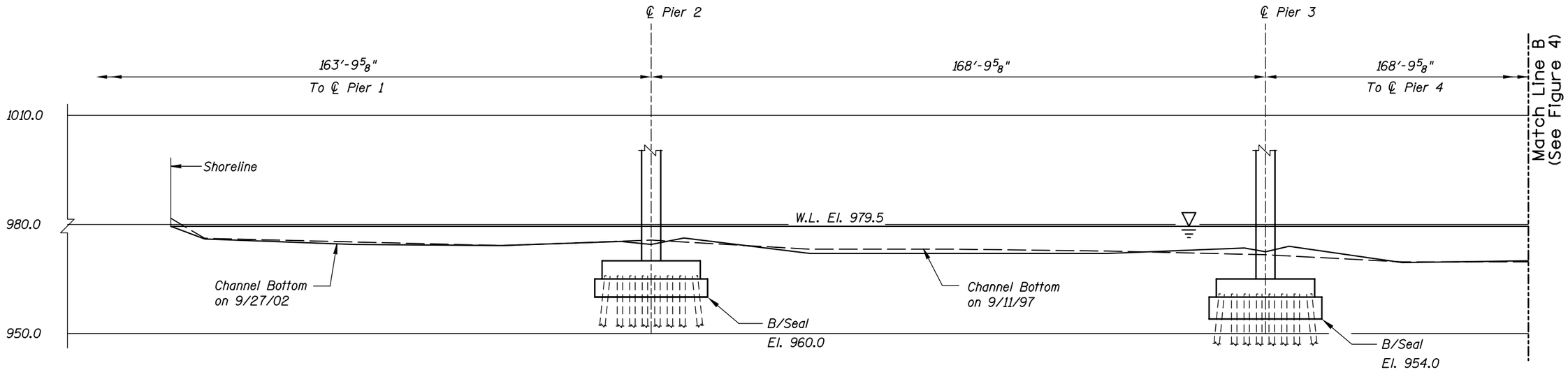
Code: 35120084		Figure No.: 2



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Notes:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 73540
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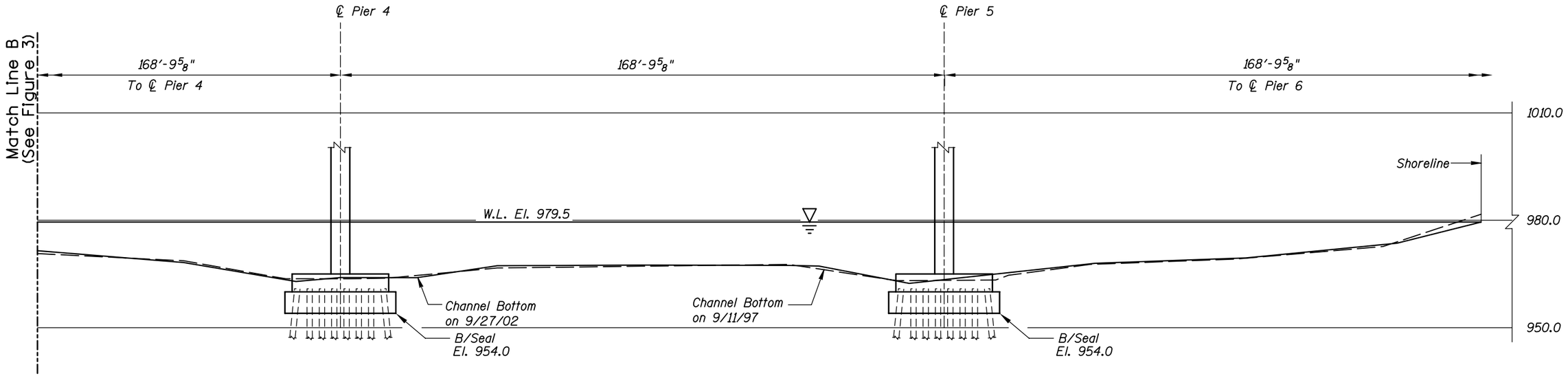
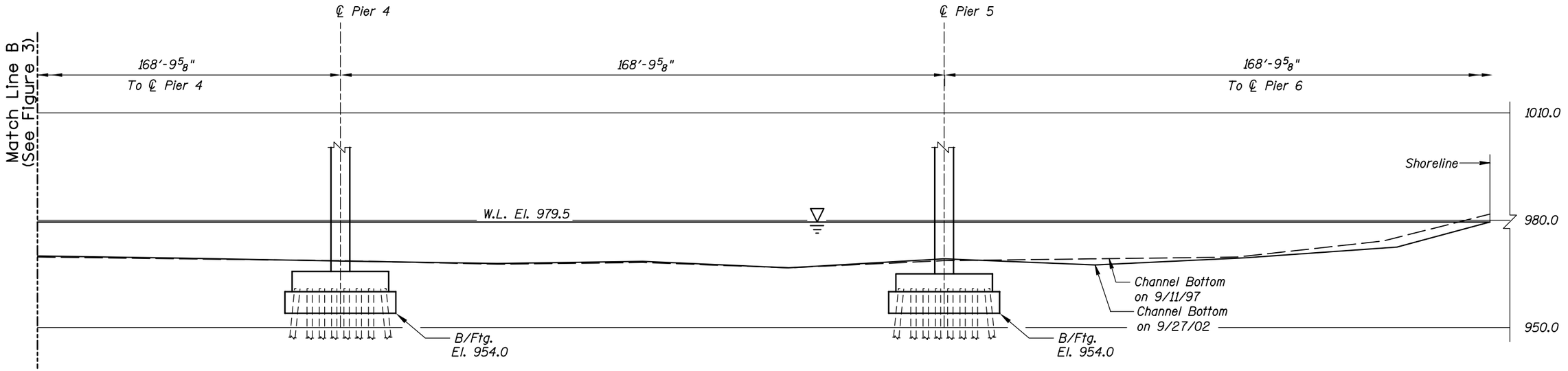
UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	**COLLINS ENGINEERS, INC.**	Date: SEPT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35I20084		Figure No.: 3



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Notes:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

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UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	**COLLINS ENGINEERS, INC.**	Date: SEPT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35I20084		Figure No.: 4

Photograph 1. Overall View of the Structure, Looking Northwest.

Photograph 2. View of Pier 2, Looking Southwest.

Photograph 3. View of Pier 3, Looking Southwest.

Photograph 4. View of Pier 4, Looking Northeast.

Photograph 5. View of Pier 5, Looking Northeast.

Photograph 6. View of Pier 6, Looking Northeast.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: September 27, 2002
ON-SITE TEAM LEADER: Shirley M. Walker, P.E.
BRIDGE NO: 73540 WEATHER: Sunny, 50EF
WATERWAY CROSSED: The Mississippi River
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER
PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins
EQUIPMENT: Scuba, U/W Light, Scraper, Fathometer, Boat, Probe Rod, Camera
TIME IN WATER: 10:15 A.M.
TIME OUT OF WATER: 11:45 A.M.
WATERWAY DATA: VELOCITY Negligible/None
VISIBILITY "1.5 feet
DEPTH 16.1 feet maximum at Pier 5.
ELEMENTS INSPECTED: Piers 2, 3, 4, and 5
REMARKS: Overall, the submerged concrete was in good, sound condition. A vertical 1/8-inch- to 1/4-inch-wide crack was observed at the center of Pier 4 along each face of the shaft that extended from the top of the web wall to 3 feet below the waterline. Footing exposure was observed at the upstream ends of both Piers 4 and 5 with a maximum vertical face exposure of 3 feet at Pier 5 and 2 feet at Pier 4. In addition, a 1/4-inch-wide crack was observed extending along the top of the exposed footing at Pier 4. A light to moderate accumulation of timber debris was observed at Piers 2, 3 and 4. The channel bottom appeared stable with minor localized scour observed at the upstream ends of the piers and no appreciable changes since the previous report.

FURTHER ACTION NEEDED: X YES _____ NO

Monitor cracks at Pier 4, and if found to be increasing repairs may be needed in the future. To repair, seal and structurally mend the cracks at Pier 4 by epoxy injecting and/or patching.

Scour screening assessment indicates stable rating, therefore, only monitor extent of scour and footing exposure during future inspections.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 73540
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The Mississippi River

INSPECTION DATE September 27, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 2	6.4’	N	8	N	9	N	8	7	N	N	6	6	8	N	N	8	N	N
	Pier 3	11.5’	N	8	N	9	N	8	7	N	N	6	6	8	N	N	8	N	N
	Pier 4	15.5’	N	6	5	9	N	6	7	N	N	7	7	6	N	N	8	N	N
	Pier 5	16.1’	N	7	6	9	N	7	7	N	N	N	7	7	N	N	8	N	

*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged concrete was in good, sound condition. A vertical 1/8-inch- to 1/4-inch-wide crack was observed at the center of Pier 4 along each face of the shaft that extended from the top of the web wall to 3 feet below the waterline. Footing exposure was observed at the upstream ends of both Piers 4 and 5 with a maximum vertical face exposure of 3 feet at Pier 5 and 2 feet at Pier 4. In addition, a 1/4-inch-wide crack was observed extending along the top of the exposed footing at Pier 4. A light to moderate accumulation of timber debris was observed at Piers 2, 3 and 4. The channel bottom appeared stable with minor localized scour observed at the upstream ends of the piers and no appreciable changes since the previous report.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.